December 3, 2004

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Dear Dr. Hering,

Enclosed please find the revised Supporting Information section of the manuscript **es048573p** "*Freshwater mussel shells as environmental chronicles: Geochemical and taphonomic signatures of mercury-related extirpations in the North Fork Holston River, Virginia"* by Megan Brown, Michal Kowalewski, Donald Cherry, Richard Neves, and Madeline Schreiber to be considered for publication in *Environmental Science & Technology.*

The revised manuscript has been edited to consist of 17 pages including figure captions (5063 words), and includes five figures and two tables. The Supporting Information section consists of six pages, including information concerning the location of sampling sites, four tables, and one graph.

Should you have any questions, please contact the communicating author at mebrown@vt.edu.

Sincerely yours,

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Supporting Information Available.

Appendix S1. Location of sampling sites.

Site 1 is approximately 3.2 km past Bradford, Virginia, where Rt. 91 north meets the river at Sagewood Road, behind the Virginia Department of Transportation sign. Site 2 is approximately 50 m downstream of the river gauging station on Rt. 91 South. Site 3 is located at river mile 79.9 and directly below the Olin-Mathieson settling ponds in Saltville. This site is approximately 0.8 km downstream from the last holding pond at the pullover with a yellow road gate on the left. The two downstream sites are located at river miles 68.6 (site 4) and 56 (site 5). Site 4 is approximately 2.4 km down Rt. 611 after it crosses Hortons Gap Road. This site is at the pullover just after the road becomes dirt. Continue down Rt. 611 until its junction with Rt. 687. Take a right on Rt. Porterfield Hwy and continue for 0.4 km until the next right, Rt. 876. Take the first right on Rt. 802 and Site 5 is at the end of Heinz Island off to the left of the road.

Table S1. The species collected from the death assemblage at each of the five sites along the North Fork Holston River.

Common Name	Genus	Species	Site
pheasantshell	*Actinonaias*	*pectorosa*	3,4
elktoe	*Alasmidonta*	*marginata*	4
spike	*Elliptio*	*dilatata*	4
Tennessee pigtoe	*Fusconaia*	*barnesiana*	1,2,4
shiny pigtoe	*Fusconaia*	*cor*	2,4
wavyrayed lampmussel	*Lampsilis*	*fasciola*	1,2,3,4,5
pocketbook	*Lampsilis*	*ovata*	3
slabside pearlymussel	*Lexingtonia*	*dolabelloides*	1,2,3,4,5
Cumberland moccasinshell	*Medionidus*	*conradicus*	1,2,3,4
Tennessee clubshell	*Pleurobema*	*oviforme*	1,2,3,4,5
fluted kidneyshell	*Ptychobranchus*	*subtentum*	1,2,3,4
kidneyshell	*Ptychobranchus*	*fasciolaris*	3,4
rainbow	*Villosa*	*iris*	1,2,3,4,5
mountain creekshell	*Villosa*	*vanuxemensis*	1,2,3,4,5

Table S2. The Hg content of shells from various species at all five sites. dbe= below detection limit.

Site	River Mile	Hg (µg/kg)	Length (mm)	Fragment Length (mm)	Genus	Species	Total Grade
Site 1	96	7	57.22		*Fusconaia*	*barnesiana*	2
Site 1	96	8	73.33		*Lampsilis*	*fasciola*	2
Site 1	96	6	65		*Lexingtonia*	*dolabelloides*	2
Site 1	96	9	54.03		*Lexingtonia*	*dolabelloides*	2
Site 1	96	6	68.39		*Pleurobema*	*oviforme*	2
Site 1	96	6	49.59		*Pleurobema*	*oviforme*	5
Site 1	96	dbe	78.03		*Pleurobema*	*oviforme*	4
Site 1	96	dbe	68.39		*Pleurobema*	*oviforme*	2
Site 1	96	dbe		57	*Ptychobranchu*	*subtentum*	6
Site 2	85	7	42.04		*Fusconaia*	*barnesiana*	4
Site 2	85	9	56.28		*Fusconaia*	*barnesiana*	1
Site 2	85	5	70.04		*Fusconaia*	*barnesiana*	4
Site 2	85	6	66.55		*Pleurobema*	*oviforme*	2
Site 2	85	5	49.27		*Pleurobema*	*oviforme*	1
Site 2	85	dbe	46.07		*Pleurobema*	*oviforme*	3
Site 2	85	8	72.25		*Pleurobema*	*oviforme*	3
Site 2	85	31	75.91		*Ptychobranchu*	*subtentum*	5
Site 3	79.9	162		72	*Actinonaias*	*pectorosa*	8
Site 3	79.9	41	73.21		*Lampsilis*	*fasciola*	3
Site 3	79.9	47	55.47		*Pleurobema*	*oviforme*	6
Site 3	79.9	4637	58.9		*Pleurobema*	*oviforme*	4
Site 3	79.9	23	78.27		*Ptychobranchu*	*subtentum*	5
Site 3	79.9	176	41.44		*Villosa*	*iris*	2
Site 4	68.6	25	114		*Actinonaias*	*pectorosa*	5
Site 4	68.6	7	55.82		*Lexingtonia*	*dolabelloides*	5
Site 4	68.6	115		54.19	*Pleurobema*	*oviforme*	6
Site 4	68.6	52	47.97		*Pleurobema*	*oviforme*	6
Site 4	68.6	20	45.3		*Pleurobema*	*oviforme*	5
Site 4	68.6	14	48.57		*Pleurobema*	*oviforme*	6
Site 4	68.6	39	39.09		*Villosa*	*iris*	2
Site 4	68.6	66	50.31		*Villosa*	*vanuxemensis*	1
Site 5	56	10	53.69		*Lampsilis*	*fasciola*	1
Site 5	56	14	63.64		*Lampsilis*	*fasciola*	3
Site 5	56	8	59.81		*Pleurobema*	*oviforme*	3
Site 5	56	6	59.06		*Pleurobema*	*oviforme*	5
Site 5	56	10	59.81		*Pleurobema*	*oviforme*	3
Site 5	56	7	59.06		*Pleurobema*	*oviforme*	5

Site 5	56	dbe	55.89	*Pleurobema*	*oviforme*	6
Site 5	56	7	48	*Villosa*	*iris*	2

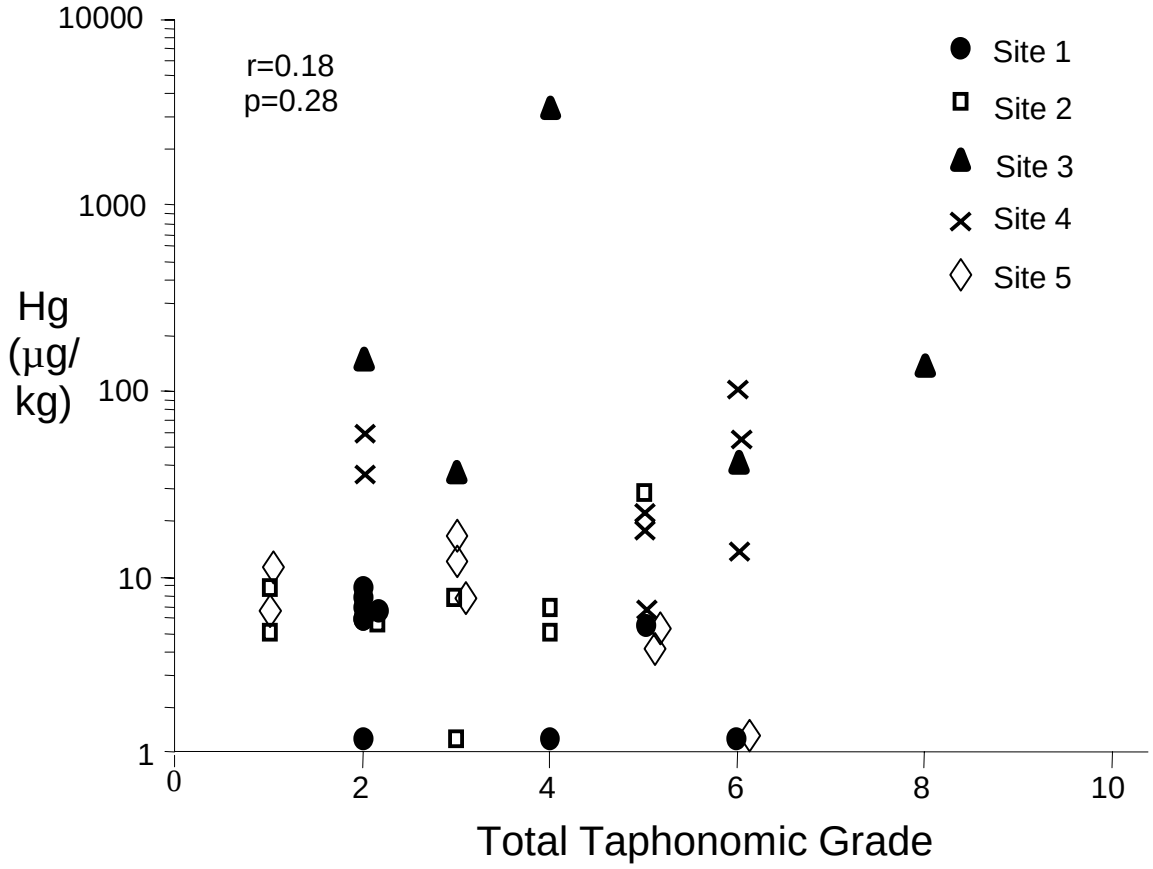
Table S3. The Hg content of shells collected at Saltville in 1917 by C. C. Adams.

Location	Year Collected	Hg Content (µg/kg)	Length (mm)	Genus	Species
Saltville	1917	5	68	*Pleurobema*	*oviforme*
Saltville	1917	6	68	*Pleurobema*	*oviforme*

Table S4. Summary of taphonomic data grouped by site and type of shell morphology.

Site	Number of shells	Articulation			Fragmentation			Edge preservation			External surface alteration			Total taphonomic grade		
		mean	Median	Std. dev.	mean	Median	Std. dev.	mean	Median	Std. dev.	mean	Median	Std. dev.	mean	Median	Std. dev.
All data pooled																
1	68	0.59	1	0.50	0.78	0	1.05	1.43	1	0.61	1.44	1	0.50	4.24	4	2.23
2	104	0.64	1	0.48	0.97	0	1.17	1.56	2	0.65	1.47	1	0.54	4.64	5	2.29
3	53	0.94	1	0.23	1.36	1	1.26	1.87	2	0.39	1.66	2	0.59	5.83	6	1.92
4	81	0.96	1	0.19	1.12	1	0.98	1.80	2	0.46	1.64	2	0.48	5.53	6	1.56
5	60	0.63	1	0.49	1.17	1	1.25	1.47	1.5	0.57	1.35	1	0.63	4.62	5	2.37
Thick shells only																
1	30	0.53	1	0.51	0.70	0	0.99	1.57	2	0.50	1.50	1.5	0.51	4.30	5	2.17
2	60	0.68	1	0.47	0.92	0.5	1.11	1.68	2	0.60	1.55	2	0.53	4.83	5	2.10
3	30	0.97	1	0.18	1.07	1	1.14	1.97	2	0.18	1.73	2	0.45	5.73	6	1.34
4	61	0.95	1	0.22	1.07	1	0.87	1.88	2	0.32	1.75	2	0.43	5.66	6	1.39
5	20	0.40	0	0.50	0.60	0.5	0.68	1.40	1	0.60	1.20	1	0.62	3.60	3	1.67
Thin shells only																
1	31	0.58	1	0.50	0.58	0	0.85	1.20	1	0.65	1.29	1	0.46	3.64	3	1.96
2	34	0.47	0	0.51	0.62	0	1.04	1.20	1	0.69	1.20	1	0.48	3.50	3	2.15
3	16	0.88	1	0.34	1.31	1	1.35	1.62	2	0.62	1.38	2	0.81	5.19	5.5	2.66
4	12	1.00	1	0.00	0.58	0	0.90	1.25	1	0.75	1.17	1	0.39	4.00	3.5	1.60
5	21	0.57	1	0.51	0.52	0	0.98	1.10	1	0.44	0.95	1	0.50	3.14	3	1.68

Figure S1.



Comparison of the overall taphonomic state of the dead-collected shells (i.e., the extent of physico-chemical shell alteration) and the Hg content of shells (log-scale) collected from the five targeted sites along the river. Each data point represents a single specimen. Symbols: *r* – Spearman rank correlation coefficient, *p* – probability that *r* = 0.